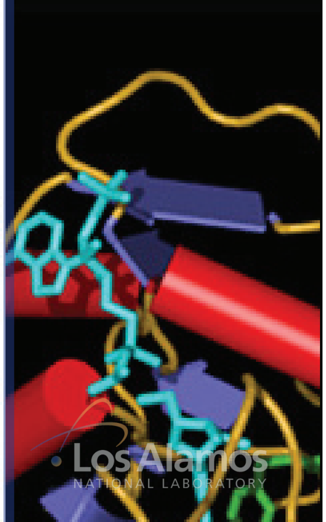
AOT & LANSCE The Pulse

June 2010

INSIDE



Journal of Low Temperature Physics invites Alex Lacerda to join editorial board

Alex Lacerda (LANSCE-DO) has joined the editorial board of the *Journal of Low Temperature Physics*. The journal serves as an international medium for the publication of original papers and review articles on fundamental theoretical and experimental research developments in all areas of cryogenics and low temperature physics. Subject areas include superconductivity, superfluidity, quantum solids, liquids and gases; matter waves; ultracold quantum gases; laser cooling; macroscopic quantum effects and coherence; magnetism and electronic properties; transport and phonon phenomena at low temperatures; quantum size effects and mesoscopic systems; low temperature technology that concerns new areas of experimental research; and applications. Lacerda is a recipient of a 2006 LANL Distinguished Performance Large Team Award for the 100T project, a Japanese Society for Promotion of Science Fellowship, a 2009 LANL Women's Diversity Working Group Outstanding Mentoring Award, and has authored more than 190 publications.

Kevin W. Jones and W. Scott Gibbs present keynote addresses

Accelerator Operation & Technology Division Leader Kevin W. Jones and Associate Director for Engineering and Engineering Sciences W. Scott Gibbs gave keynote talks at the Beam Instrumentation Workshop sponsored by Los Alamos National Laboratory in Santa Fe, New Mexico. The international workshop is dedicated to beam diagnostics and instrumentation for charged particle accelerators and beam transport lines.

Jones presented "Looking Beyond LANSCE: MaRIE," noting that the transition from "observation and validation" to "prediction and control" is the central mission challenge and the frontier of materials research. MaRIE's goals are to achieve transformational materials performance and predictive multi-scale understanding of materials. Experimental tools with unprecedented capabilities are needed to validate and test the limits of modeling and simulation. Future research capabilities must enable bridging atomic scale/molecular dynamics studies and continuum models/integrated tests. MaRIE (Matter-Radiation Interactions in Extremes) is LANL's vision for a facility to study dynamic materials by combining proton microscopy and coherent light sources with extreme environments. MaRIE is being designed to provide international user resources to solve important extreme matter

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A short history of LANSCE investments

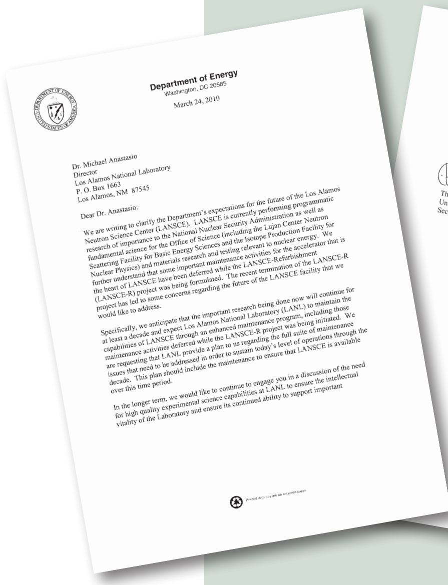
It was a pleasure to review recently the 2009 metrics for the Lujan Neutron Scattering Center at LANSCE: A record 416 unique users, more than 500 proposals submitted, 107 archival journal papers published, and exceptional beam delivery from LANSCE with 85.6% reliability at 120 microamps proton current. In the midst of many programmatic and operational challenges, science and staff talent have prevailed once again. Moreover, there is reason to be confident for the future of the Lujan Center and LANSCE under an emerging tripartite stewardship.

The last 18 months have provided ample adversity against which to rally as a team. The big story is, of course, the termination of LANSCE Refurbishment as a federal project. Presaged by prior year termination attempts dating back to a study in 2005, the February 2010 recommendation by the Office of Management and Budget was upheld in spite of enthusiastic LANSCE support from Laboratory management and Senator Bingaman (R-NM). As chair of the Senate Energy and Natural Resources Committee, Bingaman is highly influential in DOE budgeting.

Quickly, three Under Secretaries of the DOE acted together in support of LANSCE. Steve Koonin (Science), Kristina Johnson (Energy), and Tom D'Agostino (Nuclear Security) cosigned a March 24 letter to Director Mike Anastasio letter stating

"…*we anticipate that the important research being done [at LANSCE] now will continue for at least a decade and expect Los Alamos National Laboratory (LANL) to maintain the capabilities of LANSCE through an enhanced maintenance program, including those maintenance activities deferred while the LANSCE-R project was being initiated.*

"… we anticipate that the important research being done [at LANSCE] now will continue for at least a decade and expect Los Alamos National Laboratory (LANL) to maintain the capabilities of LANSCE …"


Department of Energy
Washington, DC 20585

March 24, 2010

Dr. Michael Anastasio
Director
Los Alamos National Laboratory
P. O. Box 1663
Los Alamos, NM 87545

Dear Dr. Anastasio:

We are writing to clarify the Department's expectations for the future of the Los Alamos Neutron Science Center (LANSCE). LANSCE is currently performing programmatic research of importance to the National Nuclear Security Administration as well as fundamental science for the Office of Science (including the Lujan Center Neutron Scattering Facility for Basic Energy Sciences and the Isotope Production Facility for Nuclear Physics) and materials research and testing relevant to nuclear energy. We further understand that some important maintenance activities for the accelerator that is the heart of LANSCE have been deferred while the LANSCE-Refurbishment (LANSCE-R) project was being formulated. The recent termination of the LANSCE-R project has led to some concerns regarding the future of the LANSCE facility that we would like to address.

Specifically, we anticipate that the important research being done now will continue for at least a decade and expect Los Alamos National Laboratory (LANL) to maintain the capabilities of LANSCE through an enhanced maintenance program, including those maintenance activities deferred while the LANSCE-R project was being initiated. We are requesting that LANL provide a plan to us regarding the full suite of maintenance issues that need to be addressed in order to sustain today's level of operations through the decade. This plan should include the maintenance to ensure that LANSCE is available over this time period.

In the longer term, we would like to continue to engage you in a discussion of the need for high quality experimental science capabilities at LANL to ensure the intellectual vitality of the Laboratory and ensure its continued ability to support important

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Department of Energy missions. The Department's focus on materials under extreme conditions relevant to fission, fusion and nuclear weapon systems could provide a focal point for your consideration of the longer term science facility development at LANL. We encourage you to continue the process of engaging the broader community in order to frame the key scientific challenges in this area for the next decade. We look forward to hearing of your continued progress in defining the path forward.

Sincerely,

Thomas P. D'Agostino
Under Secretary for Nuclear Security

Kristina M. Johnson
Under Secretary for Energy

Steven E. Koonin
Under Secretary for Science

We are requesting that LANL provide a plan to us regarding the full suite of maintenance issues that need to be addressed in order to sustain today's level of operations through the decade. This plan should include the maintenance to ensure that LANSCE is available over this time period."

The requested enhanced maintenance program plan and a fresh statement of mission need are under development at this writing for submission this fiscal year. Counterintuitively, NNSA signed even though it was the agency formally terminating LANSCE-R. The new tripartite partnership implies that NNSA will no longer be solo steward of the accelerator.

Funding for the $85M Enhanced Lujan Program had been contingent upon successful funding of LANSCE-R. Now that the formal project is gone, DOE

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The MaRIE conceptual design incorporates a new XFEL and a LANSCE proton beam power upgrade.

Keynote . . . challenges. The planned facility will include a fission and fusion materials facility, a multi-probe diagnostic hall, and the M4 facility dedicated to making, measuring, and modeling materials.

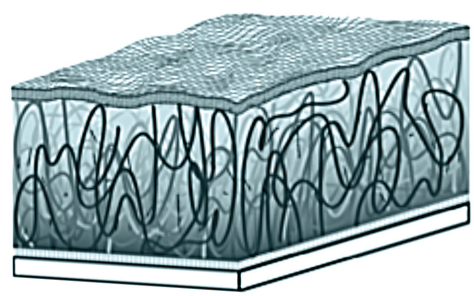
Gibbs' presentation provided an overview of the rich history of LANL's contributions to the field of accelerator technology, including the early-generation low-energy proton and electron accelerators: (1) Cockroft-Walton and Tandem proton and light ion machines for nuclear physics measurements, and (2) PHERMEX (pulsed high energy radiation machine emitting x-rays) for dense object radiography. Additional contributions include the invention of the side-coupled cavity radio-frequency accelerating structure that led to the design and construction of the Los Alamos Neutron Science Center, the world's first 1MW-class accelerator that has accelerated almost 1.4 moles of protons, and the development of proton storage ring technology for pulse compression to generate intense neutron pulses. LANSCE provides uniquely flexible time-structured beams from 100-800 MeV to serve more than 20 active experimental stations. LANL and Argonne National Laboratory jointly established the experimental physics and industrial control system collaborative community. The Laboratory performed the first lasing using a compressed electron beam, made the first measurements of longitudinal and transverse wakefields and their effects on lasing, and invented the free electron laser photoinjector. LANL developed the Dual Axis Radiographic Hydrotest Facility (DARHT) with two orthogonal high-intensity pulsed electron beam induction accelerators for dense object radiography. Gibbs also described current initiatives in accelerator science and technology, including the LANSCE Life Extension Project to revitalize core accelerator systems.

LANL accelerators: (left) LANSCE and (right) DARHT

Neutron and x-ray scattering explain structure and function of model membranes

Jaroslaw Majewski (LANSCE-LC) gave an invited talk during the American Physical Society March meeting, in Portland, Oregon. His presentation, "Neutron and X-ray Scattering from Single Supported Lipid Bilayers: Reflectometry, Grazing Incidence Diffraction and Off-Specular Scattering," described his research on model membranes.

Biological membranes are present in all living objects. They define the outer boundary of cells and their components. Membranes mediate transport and communication between the cell and its surroundings, they defend the cell against invasive agents, and most currently used drugs interact with membrane components. While biological membranes are critical features of functioning cells, their complexity renders many of their characteristics impenetrable to fundamental physical studies. Therefore, scientists are developing model lipid membranes to simplify the physical and chemical characterization of particular membrane features. During his presentation, Majewski described research with his collaborators to develop a polymer cushioned-lipid bilayer membrane as a more realistic model lipid membrane. The lipid membrane is separated from the solid support by a thermo-responsive and highly hydrated polymer (see figure) mimicking the cytoskeleton of a cell. Undulations in the lipid membrane resemble the structure of lipid membranes in living cells.



Schematic of the model polymer cushioned-lipid bilayer membrane. A thick polymer serves as a surrogate cytoskeleton backing the membrane.

Majewski (LANSCE-LC) showed how x-ray and neutron scattering techniques can provide high resolution structural information for lipid bilayers. The combination of neutron scattering techniques (which provide an excellent scattering contrast for the measurements) and x-ray scattering (which provides high resolution due to high intensities of the x-ray synchrotron sources) provide

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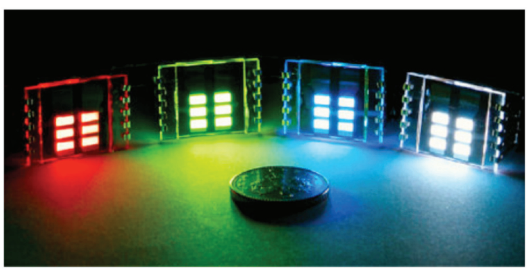
Scattering . . . direct information about the structure of the lipid membranes. Using both methods, scientists can visualize the in-plane and out-of-plane organization of lipid membranes and how this structure changes upon interaction with external molecules, such as biotoxins or drugs. The DOE Office of Basic Energy Sciences and the National Science Foundation fund the work.

Technical contact: Jaroslaw Majewski

DOE recognizes Laboratory's lighting research

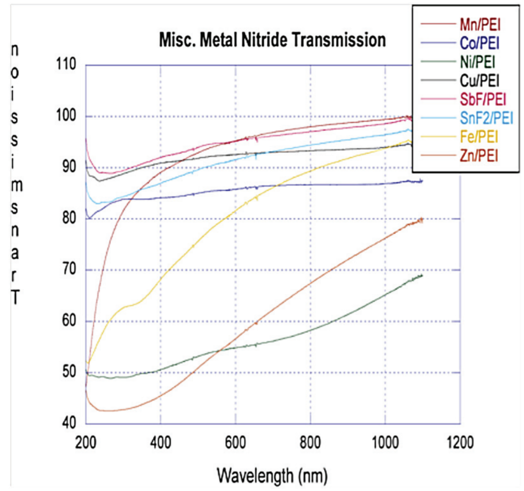
DOE recognized a team of researchers from Materials Physics and Applications and the Los Alamos Neutron Science Center for their research to develop new materials to lower the cost of organic light-emitting diode manufacturing. Anthony Burrell, Eve Bauer, and Tom McCleskey (MPA-MC); Hongmei Luo (LANSCE-LC); and Quanxi Jia (MPA-CINT) were honored at "Transformations in Lighting," the seventh annual U.S. DOE Solid-State Lighting Research & Development Workshop. The team was one of nine recognized by DOE for significant breakthroughs and achievements in 2009, representing research in light-emitting diodes and organic light-emitting diodes conducted at industry, universities, and research institutions.



Organic light-emitting diodes

Lighting consumes about one-fourth of the electricity produced annually in the U.S. Potentially more efficient and environmentally friendly than current lighting sources, organic light-emitting diodes could conceivably replace both fluorescent and incandescent lights as the primary lighting source. The organic light-emitting diodes make light by the controlled movement of electrons, not by heating up a wire filament, as in incandescent lights. Therefore, these diodes use much less energy than conventional lights. Organic light-emitting diodes also have unique properties that make them attractive for lighting applications, including making it possible to electrically control the spectral properties of the light emitted and the ability to be arranged over large areas in various shapes. These diodes are thin, flexible, and produce bright color. However, cost and long-term application are major issues of this new lighting technology because the indium used in these diodes is a limited resource.

Transparent conducting oxides are key components of organic light-emitting diodes. Their properties and production methods are



Metal nitride transmissions measured for potential use in organic light-emitting diodes.

vital to the future of solid-state lighting. Indium tin oxide is the most popular transparent conducting oxide for organic light-emitting diodes applications because of its high transparency and work function. However, indium is a rare material available from only a few places in the world. The consumption trend for indium may exceed production due to the increasing use of this material in flat panel displays and televisions.

The LANL team identified new compositions that could be alternatives to indium tin oxide for use in organic light-emitting diodes (see figure). The scientists developed transparent thin film nitrides based upon vanadium nitride doped with first row transition metals. These metals are much more readily attainable and economical than indium. The DOE Solid State Lighting program (Karl Jonietz, LANL program manager) funded the work.

Technical contact: Anthony Burrell

Understanding how polymer electrolyte for fuel cells age

Polymer electrolyte fuel cells (PEFCs) hold promise for energy production due to their high efficiency, high energy density, high power density, and zero emissions. The power-producing center of a PEFC consists of anode and cathode catalyst layers coated onto either side of an ion-exchange polymer (or ionomer) membrane. The triple-phase interface of a PEFC electrode is comprised of three commingled interfaces: a platinum/carbon (Pt/C) interface (for electron transport and catalyst particle dispersion), a Pt/ionomer interface (for proton transport to reaction sites), and an ionomer/carbon interface (for high dispersion of catalyst-support aggregates, electrode structural integrity, and high porosity for molecular oxygen/hydrogen diffusion). From a durability perspective, understanding the processes involved with catalyst-

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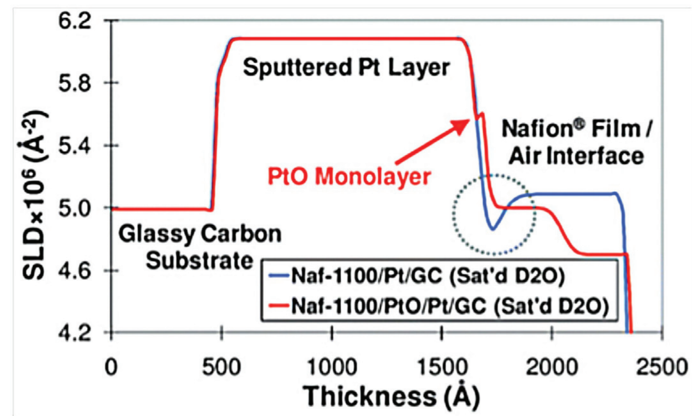
Fuel cell . . . support corrosion is important for preserving Pt/C contact and triple phase integrity. Identifying these essential interfacial and structural phenomena and related degradation processes will help lead to improved electrode longevity and performance, as well as improved catalyst-support and membrane durability.

Jerzy Chlistunoff and Rodney Borup (MPA-11), Jaroslaw Majewski (LANSCE-LC), and David Wood (formerly MPA-11, currently Oak Ridge National Laboratory) used the surface profile analysis reflectometer (SPEAR) at LANSCE to examine the interactions of the PEFC materials that comprise the triple-phase interface where the electrochemical reactions occur. Neutron reflectometry measures thickness resolution to several angstroms. The experiments examined a commercially available ionomer, Nafion, which is used in PEFCs. Nafion contains a hydrophobic backbone with hydrophilic sulfonated, ether-containing side chains.

When the scientists used smooth, idealized layers of Nafion on glassy carbon and platinum surfaces as experimental models for the PEFC electrode interfaces, they found that separate hydrophobic and hydrophilic domains formed within the Nafion layer when equilibrated with saturated deuterated water vapor (see figure at right). The findings reveal that the material with which Nafion is in contact affects Nafion's interfacial and long-range structural properties. A hydrophobic Nafion region is formed adjacent to a platinum film. However, when Nafion is in contact with a platinum oxide (PtO) surface, the Nafion at the interface becomes hydrophilic. The adsorbed oxide layer causes a long-range restructuring of the polymer chains that comprise Nafion. The thickness of the hydrophobic and hydrophilic domains change to the same magnitude when the oxide layer is present compared to a thin hydrophobic domain in contact with Pt. The scientists developed a concept of the polymeric structure near the Pt or PtO interface in which strong interactions between a smooth flat surface and the hydrophilic side chains or hydrophobic backbone of Nafion are likely to lead to the polymer chains lying flat on that surface. A templating effect causes layering in which the first layer of polymer chains interacts relatively strongly with the substrate and acts as a template for the second layer. As the hydrophobic and hydrophilic components in the second layer of polymer chains arrange themselves, they adhere to the corresponding hydrophobic and hydrophilic components in the first layer. The data suggest that the structure of Nafion is modified and becomes anisotropic due to interactions with the substrate. The scientists discovered that a three-layer Nafion structure is formed in direct contact with glassy carbon, and aging of Nafion under simulated PEFC conditions leads to an irreversible swelling of the Nafion film. The study is significant for fuel cell research and development because an understanding of Nafion interfacial phenomena can help improve catalyst utilization and durability of polymer electrolyte fuel cells. Reference: "Nafion Structural Phenomena at Platinum and Carbon Interfaces," appears in Journal of the American Chemical Society **131** (2009). The DOE Fuel Cell Technologies Program, Office of Energy Efficiency and Renewable Energy, and the Office of Basic Energy Sciences supported the work.

Technical contacts: Jerzy Chlistunoff and Rodney Borup



Neutron scattering length density profiles for platinum/Nafion interfaces, demonstrating the presence of a hydrophobic layer (circled) in Nafion in the immediate vicinity of a bare platinum surface (blue line) and the lack of it for an oxidized platinum surface (red line).

Determination of protonation states in hemoglobin

Hemoglobin (Hb) is an essential protein, which enables humans to breathe. Hb efficiently transports oxygen (O_2) from lungs to tissues. Hb's ability to function properly depends tremendously on binding hydrogen ions (protons, H^+) to specific sites on the Hb molecule. Deoxygenated Hb has low affinity for O_2, but high affinity for H^+. Binding of four O_2 molecules to heme groups produces oxygenated Hb, with reversed affinities to O_2 and H^+. In other words, release of O_2 from oxy-Hb in tissues results in the uptake of extra H+ by the deoxy-Hb. The reversible binding of protons is key to the regulation of human Hb. Histidine (His) amino-acid residues have been identified as potential H+ binding sites; however, x-ray crystallographic and various spectroscopic techniques have not been able to determine their protonation states. However, neutron diffraction is powerful in its ability to visualize and determine the positions of hydrogens in a protein. Therefore, scientists selected neutron protein crystallography at the Lujan Neutron Scattering Center to study deoxy-Hb with the aim to resolve the protonation states of all His residues.

The Protein Crystallography Station Team at LANSCE (Andrey Y. Kovalevsky, Marat Mustyakimov, Zoe Fisher, and Paul Langan of B-8) and collaborators from Kyoto University, Jichi Medical

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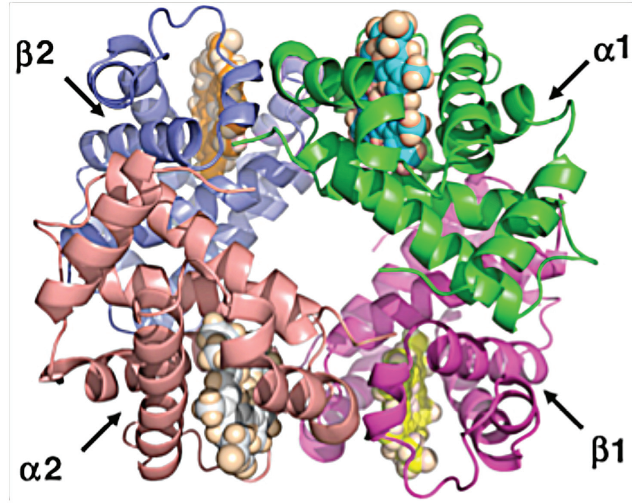
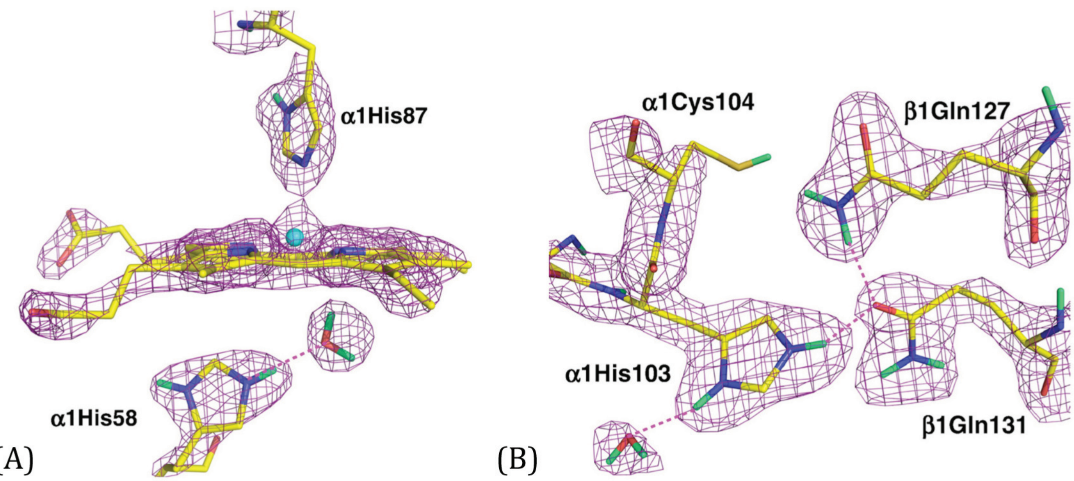
Protonation . . . University, and Yokohama City University (Japan) used the Lujan Protein Crystallography facility to determine the neutron structure of deoxy-Hb (see figure at right). The scientists unequivocally assigned the protonation states of all of the ordered amino acid residues, including 35 of the 38 His residues. The data provide insight into the mechanism that Hb employs to bind and release H+.

The unexpected and most significant finding of the study was that distal-to-heme histidines (αHis58 and βHis63) (See figure A below), located near the O_2 binding site, and buried histidines (αHis103) (see figure B) were doubly protonated. The side-chain imidazole ring's nitrogen atoms were both bound to hydrogens (deuterium atoms in the study are used to enhance neutron scattering). These findings suggest the distal and buried His involvement in H^+ binding and release during oxygen transport. This knowledge is crucial for understanding how Hb functions and potentially could be exploited in medical applications to design better blood substitutes. Reference: "Direct Determination of Protonation States of Histidine Residues in a 2 Å Neutron Structure of Deoxy-Human Normal Adult Hemoglobin and Implications for the Bohr Effect," *Journal of Molecular Biology* **398**, 276 (2010). The DOE Office of Biological and Environmental Research funds the Protein Crystallography Station. A National Institutes of Health-National Institute of General Medical Sciences-funded consortium between LANL and Lawrence Berkeley National Laboratory provided support to develop computational tools for neutron protein crystallography. LANL Laboratory Directed Research and Development (LDRD) funded some aspects of the LANL research.



The overall structure of deoxy-HbA in cartoon representation. Heme groups are shown in stick representation, iron (II) metal ions bound to hemes are orange spheres.



The protonation states of (A) distal α1His58 and (B) buried α1His103 residues. The neutron scattering density is shown as purple wire net. Carbon atoms are green, nitrogen is blue, oxygen is red, and deuterium atoms are yellow, while hydrogen atoms are grey.

From Alan's Desk . . . Basic Energy Sciences is awaiting a definite financial commitment to the long-term life of the accelerator before investing in ELP.

Intra-DOE partnerships have been successful in the recent past at LANSCE. On April 17, 1996, LANL Director Sig Hecker and LANSCE Director John Browne visited Energy Research (ER) Director Martha Krebs (approximately Koonin's predecessor) and Assistant Secretary for Defense Programs (DP) Vic Reis (approximately D'Agostino's predecessor) to propose a historic plan for the stockpile stewardship and science missions of Los Alamos. In follow-up on May 1, Hecker signed a letter summarizing the proposal, and quickly on July 11 Krebs and Reis cosigned a letter creating the Short Pulse Spallation Source (SPSS) upgrade project:

"…DP and ER intend to initiate the SPSS upgrade in FY 1997. To accomplish this will require congressional approval of a reprogramming of FY 1997 DP funds. DP will proceed with this request to reprogram funds in FY 1997 as soon as Los Alamos provides DP with a cost/schedule breakdown for the project from its

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From Alan's Desk . . . *currently estimated [$16.4 million] FY 1997 DP budget. Pending a successful reprogramming, DP intends to incorporate SPSS in its FY 1998 budget request. Additionally, the Office of Energy Research (ER) agrees to support, after congressional notification, the SPSS facility by designing and building the required new instrumentation for a total cost of approximately $21.9 million. Upon completion of the SPSS, ER will provide increased funding for user operation and DP will continue to operate LANSCE."*

(The name "Short Pulse Spallation Source" refers to the traditional accelerator spallation-reaction method of producing neutrons in microsecond pulses optimized for time-of-flight techniques.)

The DP-ER partnership in the 90s resulted in a successful accelerator upgrade and, with help from LDRD, NSF, and other agencies, funded eight new instruments at the Lujan Center. Today's tripartite partnership between NNSA, SC, and NE, heralded by the recent letter, augurs well for the future of LANSCE based on this history

While the decision making of that era sounds remarkably efficient from today's viewpoint—only four months elapsed from proposal to funding commitment—in fact much groundwork had been carefully laid for stockpile stewardship at Los Alamos. Through a long series of community-building meetings culminated by a defense science conference in 1995, the plan carried by Browne and Hecker to Washington in 1996 had been well vetted. A similar outreach model is being followed for recent major program developments at LANSCE including the Enhanced Lujan Program and MaRIE.

We must be mindful that the DP-ER partnership of the mid-90s was not completely successful. The instrumentation budget from ER fell $8M short when in 2001 BES retracted funding for an inelastic neutron scattering instrument from Lujan Center, leaving a gap in capability that remains unfilled. However, even this legacy was not the most important shortfall in fulfilling the Browne-Hecker vision for LANSCE.

In the same remarkable 1996 letter from Hecker to Krebs and Reis, a one-megawatt Long-Pulse Spallation Project (LPSS) was described as "the Los Alamos National Laboratory's highest priority new research facility over the next five years." Boldly conceived by Feri Mezei at LANSCE in the early 90s, the LPSS puts more protons on target—thereby increasing neutron production—by utilizing full-length millisecond pulses directly from the proton linac rather than compressed, submicrosecond pulses from the LANSCE Proton Storage Ring. Because LPSS inherently implies loss of resolution in measuring time of flight, it took time to convince the neutron community in the benefits of LPSS. Most importantly, a 2000x longer, albeit less intense, proton pulse answers the need for more neutron flux. In addition, target material stress can be better managed, and the sometimes-unreliable PSR could be taken out of the circuit.

LANSCE staff tested the long-pulse concept for the first time in 2003 proving that, since the diffusive stretch of a neutron pulse after passing through a moderator is already "long," the loss of time resolution for cold-neutron scattering experiments is tolerable. Browne and Hecker had bet correctly that the LPSS would work.

Regarding the $140M LPSS proposed in 1996 for LANSCE's Area A, Krebs and Reis replied,

"*DP agrees that this facility is highly valuable to the stockpile stewardship program. As such, DP will take the actions necessary to enable the Department to expeditiously make a Critical Decision One (CD-One) decision, Justification of Mission Need and authority to prepare a Conceptual Design Report (CDR), and ER will support the mission need for the facility…DP will work closely with the Los Alamos National Laboratory (LANL) to ensure the project is ready as soon as possible for the laboratory's and DP's budget formulation deliberations. Consistent with DP's usual practice, funding for a CDR must come from available resources in the LANL base program. Additionally, contingent upon the results of further research and development scheduled to begin in FY 1998, ER would fund the design, development, and fabrication of instruments for the LPSS at a total cost currently estimated at about $40 million…*"

History can be a harsh tutor, harsher still if forgotten. The LPSS was never built. It joined other Los Alamos inventions that were eagerly adopted elsewhere: The first high power LPSS will be built in Europe—the 5 MW European Spallation Source (ESS)—or perhaps at Oak Ridge's Spallation Neutron Source as a second target. Hecker and Browne emphasized that the scientific footprint of a megawatt LPSS would have been very broad. For a time, it appeared that LANSCE had a future and solid support from DOE through the DP-ER partnership, the stewardship vision of LANL as the "neutron lab" at the cutting-edge of neutron science, and a magnet facility attracting a broad community of defense and academic users.

Alas, the Browne-Hecker-Reis-Krebs vision was knocked off track by larger issues starting with the Wen-Ho Lee affair and a safety stand-down at LANSCE. The termination of LANSCE-R is the latest issue threatening LANL's signature facility development. Out of this uncertainty, however, a new partnership appears to be forming at DOE that gives hope for MaRIE.

Lujan Neutron Scattering Center Director Alan J. Hurd

Laboratory's top-notch science, facilities are focus of summer lecture series

The fourth annual Summer Lecture Series is underway and features talks by Laboratory scientists, tours of the Laboratory's national user facilities, and closes out with an ice cream social with dessert served by Laboratory Director Michael Anastasio. The series runs through July 28 with events held in a variety of locations.

MPA and MST divisions and the LANL Institutes sponsor the series, which presents a wide spectrum of LANL science to the Laboratory's students, postdoctoral researchers, staff, and visitors. This year's series includes 16 talks by distinguished LANL scientists, a panel discussion on climate change, and tours of the Los Alamos Neutron Science Center, the Center for Integrated Nanotechnologies and the National High Magnet Field Laboratory-Pulsed Field Facility. Lectures are open to LANL badge holders, with selected lectures also open to the public.

"All the talks are carefully selected and are talks worth attending," said Tomasz Durakiewicz (MPA-CMMS), who organized the program. "The talks are usually very popular. For several talks in the past, we have enjoyed crowds larger than the room capacities." Not to be missed, Durakiewicz said, is the ice cream social with the Laboratory Director on July 28 at 2 p.m. in the Materials Science Laboratory courtyard.

According to Durakiewicz, one of the series' most anticipated featured speakers is Laboratory Fellow Jim Smith (MST-6), who this year will discuss "Schizophrenic Electrons" on June 16. Smith will provide an introduction for the "Novel Superconductors" talk presented by another Laboratory Fellow and popular speaker, Zachary Fisk (MPA-CMMS) on July 12. The Summer Lecture Series also features five sessions of climate-oriented talks, including a panel discussion on anthropogenic global warming, which will be held July 14-19.

"LANL has a lot to offer in several disciplines and this is the message we want our students to take home," Durakiewicz said. For the schedule, please see institutes.lanl.gov/lecture/leaflet2010.pdf.

Summer Lecture Series contact: tomasz@lanl.gov

Celebrating service

Congratulations to the following LANSCE and AOT Division employees celebrating service anniversaries this month:

Chandra Pillai, AOT-ABS	25 years
Angela Naranjo, AOT-MDE	25 years
Heather Martinez, AOT-MDE	5 years
Leslie Sasa, LANSCE-LC	5 years
Tamsen Schurman, LANSCE-NS	5 years

HeadsUP!

Your LANSCE WSST members

Borrego, Melvint	LANSCE-LC
Keane, Kristy	LFO-DO
Alvestad, Hank	AOT-ABS
Bacon, Jeffrey	P-25
Bitteker, Leo	LANSCE-NS
Chacon, Phillip	AOT-IC
Gonzales, Fermin	AOT-IC
Graham, John	ADESHQ
Greene, Steve	P-25
Harrison, John	AOT-MDE
Ivie, Linda	LFO-DO
Jones, Daryl	PS-4
Lyles, John	AOT-RFE
Madrid, Kenny	MSS-LFO
Martinez, Taylor	ISR-6
Medina, Tim	LANSCE-LC
Morgan, Carl	HIS-OS
Nolen, Tom	EO-EPP
Okamoto, Nathan	AOT-ABS
Reass, Bill	AOT-RFE
Salazar, Tanya	RP-1
Salazar, Tracy	LFO-DO
Spickermann, Thomas	AOT-OPS
Sturrock, James	AOT-OPS
Turner, Frankie	LFO-DO
Valdez, Sandra	P-23
Schoenberg, Kurt	ADEPS
Hurd, Alan	LANSCE-LC
Jones, Kevin	AOT-DO
Erickson, John	AOT-DO
Nekimken, Howard	EPS-OPS
Seely, Dan	LFO-DO
Wender, Steve	LANSCE-NS

AOT & LANSCE The Pulse

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